

CARDIOVASCULAR SYSTEM : ANATOMY & PHYSIOLOGY

FUNCTION OF CIRCULATION

Delivers O₂ , nutrients, hormones and antibodies to organs, tissues and cells
Removes the end product of cellular metabolism

FUNCTION OF THE HEART

Pumps oxygenated blood into the arterial system to supply capillaries and tissue
Pumps oxygen poor blood from the venous system through the lungs to be reoxygenated.

ANATOMY OF THE HEART

Cone shaped organ located in the mediastinal space.
The pericardial sac encases the heart and protects it, lubricates and holds 5-20 ml of pericardial fluid. This has two layers.

- ✦ the parietal pericardium which is the outer membrane
- ✦ the visceral pericardium is the inner membrane attached to the heart.

CONSISTS OF 3 LAYERS

- ✦ Epicardium : outermost layer of the heart
- ✦ Myocardium: middle layer of the heart, the contracting muscle
- ✦ Endocardium: innermost layer of the heart, lines the inner chambers and the valves.

4 CHAMBERS

- ✦ Right atrium: carries deoxygenated blood from the body via superior and inferior vena cava.
- ✦ Right ventricle: carries blood from the right atrium and pumps it into the lungs through the pulmonary artery
- ✦ Left atrium: carries oxygenated blood from the pulmonary veins
- ✦ Left ventricle: carries oxygenated blood from the left atrium and pumps it into the systemic circuit through the aorta.

4 VALVES

Two atrioventricular valves that close at the beginning of ventricular contraction. They prevent blood from flowing back into the atria.

- ✦ Tricuspid valve : on the right side of the heart
- ✦ Bicuspid valve: on the left side of the heart

Two semilunar valves that prevent blood from flowing back into the ventricles during relaxation

- ✦ Pulmonic semilunar valve: between the right ventricle and pulmonary artery
- ✦ Aortic semilunar valve: between the ventricle and the aorta.

CORONARY ARTERIES

- ✦ Right main coronary artery: supplies the right atrium and ventricle, the inferior left ventricle, posterior septal wall, SA and AV nodes.
- ✦ Left main coronary artery: consists of two main branches left anterior descending which supplies blood to the left ventricle and the ventricular septum and circumflex arteries which supply blood to the left atrium and the lateral/posterior aspects of the left ventricle.

BLOOD FLOW OF THE HEART

1. From the superior and inferior vena cava oxygen poor blood goes to the
2. Right atria through the tricuspid valve
3. Right ventricle to the pulmonary valve
4. To the pulmonary trunk and arteries into the lungs Co₂ is lost and O₂ is gained in the pulmonary capillaries
5. O₂ rich blood enters the pulmonary veins to the left atrium
6. Blood travels through the bicuspid valve and enters the left ventricle
7. Blood moves through the aortic valve and travels through the aorta to the systemic circuit



Sectional Anatomy of the Heart

ELECTRICAL CONDUCTION

- ✦ SA node: pacemaker of the heart and initiates contraction at 80- 100 BPM.
- ✦ AV : receives impulses from the SA node initiates and sustains impulses at 40-60 BPM
- ✦ Bundle of His: continuation of the AV node and branches into the the bundle branches which terminate in the purkinje fibers
- ✦ Purkinje fibers: network of conducting strands beneath the ventricular endocardium. They can act as a pacemaker when the SA and AV fail as pace makers. They can sustain at 20-40 BPM

Guide Cardiovascular

**Dennis A. Tighe, Maichi T. Tran, Jennifer
L. Donovan, James R. Cook**

Guide Cardiovascular:

Practical Guide to Cardiac CT Armin Arbab Zadeh, John Hoe, 2024-10-28 This book provides a practical easy to understand approach to the clinical practice of cardiac CT imaging Written by international leaders in the field with many years of experience in education and practice the book provides the necessary background to understand all aspects of cardiac CT imaging paired with practical instructions to acquire CT images optimize image for interpretation and to appropriately interpret scans An emphasis is placed on concise text abundance of tables and illustrations and easily searchable information The book builds on years of experience in educating and instructing physicians on all aspects of cardiac CT imaging The book includes chapters on latest and evolving technologies and envisions a link to online applications for enhanced readily available instruction This book offers valuable assistance to medical practitioners and trainees on how to safely acquire and interpret cardiac CT images for a wide spectrum of indications including coronary heart disease cardiac rhythm disorders structural heart disease interventional cardiology and valvular heart disease *Cardiology Drug Guide* 2010 Dennis A. Tighe, Maichi T. Tran, Jennifer L. Donovan, James R. Cook, 2010-03-10 **Clinical Guide to Cardiology** Christian Fielder Camm, A. John Camm, 2016-03-07 Clinical Guide to Cardiology is a quick reference resource packed full of bullet points diagrams tables and algorithms for the key concepts and facts for important presentations and conditions within cardiology It provides practical evidence based information on interventions investigations and the management of clinical cardiology Key features include A clear evidence base providing key guidelines and clinical trials in each chapter Coverage of examination techniques common conditions imaging modalities including ECGs chest X rays MRI and CT interventional therapies and pharmacology A companion website at www.wiley.com/go/camm_cardiology featuring audio clips developed for differing levels of knowledge that explain key concepts or an area in greater detail as well as numerous additional clinical case studies audio scripts and self assessment material **Guidelines for Cardiac Rehabilitation and Secondary Prevention Programs** American Association of Cardiovascular & Pulmonary Rehabilitation, 2004 This edition addresses the cost effectiveness of interventions that educate and motivate patients to assume personal responsibility for long term disease prevention **Handbook of Cardiac Anatomy, Physiology, and Devices** Paul A. Iaizzo, 2010-03-11 A revolution began in my professional career and education in 1997 In that year I visited the University of Minnesota to discuss collaborative opportunities in cardiac anatomy physiology and medical device testing The meeting was with a faculty member of the Department of Anesthesiology Professor Paul Iaizzo I didn't know what to expect but as always I remained open minded and optimistic Little did I know that my life would never be the same During the mid to late 1990s Paul Iaizzo and his team were performing anesthesia research on isolated guinea pig hearts We found the work appealing but it was unclear how this research might apply to our interest in tools to aid in the design of implantable devices for the cardiovascular system As discussions progressed we noted that we would be far more interested in reanimation of large mammalian hearts in

particular human hearts Paul was confident this could be accomplished on large hearts but thought that it would be unlikely that we would ever have access to human hearts for this application We shook hands and the collaboration was born in 1997 In the same year Paul and the research team at the University of Minnesota including Bill Gallagher and Charles Soule reanimated several swine hearts Unlike the previous work on guinea pig hearts which were reanimated in Langendorff mode the intention of this research was to produce a fully functional working heart model for device testing and cardiac research

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searchable text and patient information **Introductory Guide to Cardiac Catheterization** Arman T. Askari, Medhi H. Shishehbor, Adrian W. Messerli, Ronnier J. Aviles, 2012-05-15 Updated for its Second Edition Introductory Guide to Cardiac Catheterization is an easy to follow how to guide to diagnostic and therapeutic cardiac catheterization This pocket sized concise manual presents practical pointers tips ACC AHA guidelines and highlighted clinical pearls and includes troubleshooting sections that provide solutions to frequently encountered problems Numerous illustrations demonstrate the complex procedures now being performed via the catheter This edition has a section on complications in each chapter a new chapter on peripheral angiography and a new question and answer review chapter Other highlights include new safety precautions and updates on novel closure devices *Guidelines for Cardiac Rehabilitation Programs* American Association of Cardiovascular & Pulmonary Rehabilitation, 2021 Guidelines for Cardiac Rehabilitation Programs Sixth Edition offers procedures for providing patients with low cost high quality programming that moves them toward a lifelong commitment to disease management *Grossman & Baim's Handbook of Cardiac Catheterization, Angiography, and Intervention* Mauro Moscucci, Marc D. Feldman, 2023-08-29 An easily accessible ready reference for the entire cardiac team Grossman Baim s Handbook of Cardiac Catheterization Angiography and Intervention is an essential resource in today s cardiac catheterization lab This practical handbook edited by Dr Mauro Moscucci with contributions from associate editor Marc D Feldman follows the bestselling text Grossman Baim s Cardiac Catheterization Angiography and Intervention providing fast convenient access to authoritative information in a portable handbook format *ACLS Study Guide - E-Book* Barbara J Aehlert, 2011-12-08 Reflecting the 2010 Emergency Cardiovascular Care guidelines ACLS Study Guide 4th Edition offers a complete full color overview of advanced cardiovascular life support An easy to read approach covers everything from airway management and rhythms and their management to electrical therapy acute coronary syndromes and acute stroke In addition to the latest ACLS treatment algorithms this edition includes new case studies new photos and illustrations a heart rate ruler and a handy ACLS quick reference card for use in the field Written by Barbara Aehlert ACLS Study Guide is the official textbook for the American Safety Health Institute ACLS certification course A pretest and posttest each containing 50 questions with answers and rationales allow you to check your knowledge prior to and after your study Chapter objectives preview the main points in each chapter Stop and Review sections at the end of the chapters help you remember the most important information ACLS Pearls boxes offer key points and useful tips for clinical practice Keeping it Simple boxes provide essential information in a clear and concise manner Ten case studies present real life clinical situations allowing you to make decisions based on information in the Preparatory section Consistent format of case studies includes Objective Skills to Master Rhythms to Master Medications to Master Related Text Chapters Essential Actions and Unacceptable Actions A heart rate ruler is included to help you interpret ECGs 4 x 6 pocket size quick reference card contains key ACLS algorithms for field use 100 new and updated photos and illustrations show key ACLS procedures and equipment Pharmacological interventions are

integrated into the chapters for a more cohesive learning experience New streamlined approach reduces the number of pages and simplifies the information you need to know **ACSM's Resource Manual for Guidelines for Exercise Testing and Prescription** David P. Swain,ACSM,Clinton A. Brawner,2012-12-26 ACSM s Resource Manual for Guidelines for Exercise Testing and Prescription was created as a complement to ACSM s Guidelines for Exercise Testing and Prescription and elaborates on all major aspects of preventative rehabilitation and fitness programs and the major position stands of the ACSM The 7th edition provides information necessary to address the knowledge skills and abilities set forth in the new edition of Guidelines and explains the science behind the exercise testing and prescription ACSM s Resource Manual is a comprehensive resource for those working in the fitness and clinical exercise fields as well as those in academic training

Guidelines for Cardiac Rehabilitation and Secondary Prevention Programs AACVPR,2013-08-02 Guidelines for Cardiac Rehabilitation and Secondary Prevention Programs Fifth Edition With Web Resource covers the entire scope of practice for cardiac rehabilitation and secondary prevention CR SP programs This text was developed by the American Association of Cardiovascular and Pulmonary Rehabilitation AACVPR and parallels federal guidelines for cardiac rehabilitation programs It contains information on promoting positive lifestyle behavior patterns reducing risk factors for disease progression and lessening the impact of cardiovascular disease on quality of life morbidity and mortality The text has been updated and restructured providing the most current models for designing and updating rehabilitation programs for patients and preventing second episodes In addition to chapter revisions there is new content on behavior modification risk factors and special populations The chapter covering program administration has been completely rewritten to include new regulations and reimbursement standards as well as additional suggestions for new models for CR SP The most recent Core Competencies for Cardiac Rehabilitation and Secondary Prevention Professionals and the Core Components of Cardiac Rehabilitation Secondary Prevention Programs have also been included in their entirety More than 50 leaders in the field of CR SP cardiovascular risk reduction reimbursement and public policy have contributed the latest tools and information enabling cardiac rehabilitation professionals to successfully start new programs or update and enhance existing ones Key features of the fifth edition include the following A new web resource incorporates 24 questionnaires charts consent forms protocols records checklists and logs from the text that can be used when creating or assessing programs Highlighted guidelines in each chapter cover current issues and provide hints and methods for implementing treatment programs and helping patients stay on track Chapter objectives and summaries help readers quickly assess the topics covered and identify the most important points There is strong evidence that participation in outpatient cardiac rehabilitation and secondary prevention programs decreases mortality and recurrent morbidity after a cardiac event Guidelines for Cardiac Rehabilitation and Secondary Prevention Programs Fifth Edition offers procedures for providing patients with low cost high quality programming moving them toward personal responsibility for disease management and secondary prevention over a lifetime

This is the definitive resource for developing inpatient and outpatient cardiac rehabilitation programs Acute Care Handbook for Physical Therapists - E-BOOK Kathryn Panasci, Kristin C. Greenwood, 2025-10-27 Master the essential information you need to know to effectively treat and manage patients in the complex acute care environment with Acute Care Handbook for Physical Therapists Sixth Edition This easy to follow guide is the perfect resource to help you better understand and interpret hospital protocol safety guidelines medical terms and the many aspects of patient care in the hospital setting from the emergency department to the intensive care unit to the general hospital floors Featuring extensively updated content that reflects the latest evidence based information this edition contains everything needed for success in today's fast paced acute care environment NEW Chapters cover interprofessional practice and psychological and mental health NEW Content addresses emerging topics in post intensive care syndrome and COVID UPDATED Enhanced focus on transition to practice helps ensure you are confident and prepared for the clinical setting NEW Enhanced ebook version included with every new print purchase features reflection questions and a study guide plus digital access to all the text figures and references with the ability to search customize content make notes and highlights and have content read aloud Evidenced based information ensures you are equipped with the knowledge needed to manage the acuity of patients in the acute care environment Up to date content on medications laboratory and diagnostic tests and medical interventions relevant to the acute care physical therapist Easy to read algorithms tables boxes and clinical tips highlight key information for quick reference *Cardiovascular Care Made Incredibly Easy!* ,2009 A handy reference for those entering or needing a refresher in cardiovascular nursing care *Cardiovascular Medicine* James T. Willerson, Jay N. Cohn, Hein J.J. Wellens, David R. Holmes, 2007-12-06 This book offers the most up to date user friendly guidance on the evaluation diagnosis and medical and surgical treatment of heart and vascular disease The book and DVD package is designed to provide comprehensive coverage of every aspect of cardiovascular medicine The book has consistent chapter organization relevant to modern cardiovascular practice clear design and engaging text The reader will have all the guidance to diagnose and manage the full range of cardiovascular conditions in one textbook resource while also benefiting from access to additional video material from the integral DVD ROM This includes over 100 individual heart sounds **Saunders Nursing Survival Guide: Critical Care & Emergency Nursing** Lori Schumacher, Cynthia C. Chernecky, 2009-06-30 Part of the popular Saunders Nursing Survival Guide series this book prepares you to manage the most common health care problems you'll see in critical care trauma or emergency settings Each chapter is organized from the most immediate and life threatening conditions to less emergent critical care conditions Its lighthearted cartoon filled approach simplifies difficult concepts covering each body system in terms of current practice standards Consistent headings break content into four succinct areas of review What subject IS What You NEED TO KNOW What You DO and Do You UNDERSTAND Clinical terms and shorthand expressions are highlighted exposing you to terminology used in the hospital setting A color insert illustrates concepts and principles of

critical care and emergency nursing including various complications Mnemonic devices aid your memory and interactive activities help you learn with exercises including fill in the blank matching word jumbles true false and crossword puzzles Special icons help you focus on vital information Take Home Points help you prepare for clinical rotations Caution notes alert you to dangerous conditions and how to avoid them Lifespan notes point out age related variations in signs and symptoms nursing interventions and patient teaching Culture notes cite possible variations related to a patient's cultural background Web links direct you to Internet resources for additional research and study What You WILL LEARN learning objectives help you identify quickly the content covered and goals for each chapter NCLEX examination style review questions at the end of each chapter allow you to test your understanding of content and practice for the Boards Cartoon characters with brief captions help to better explain difficult concepts Margin notes are streamlined for ease of use and effectiveness Content updates reflect current practice and emergent situations including increased focus on disaster preparedness code management updated ACLS guidelines and hypertension

National Library of Medicine Audiovisuals Catalog

National Library of Medicine (U.S.), **Essential Cardiology** Clive Rosendorff, 2007-11-05 A panel of leading researchers and clinician scientists distill from years of practical experience and recent scientific and clinical advances the essence of cardiology principles and techniques today In this second edition all of the original chapters have been extensively rewritten and two new chapters on acute coronary syndromes following the modern classification have been added one on unstable angina pectoris and non ST segment elevation myocardial infarction and the other on ST segment elevation myocardial infarction Compact yet comprehensive Essential Cardiology Principles and Practice Second Edition offers today's busy cardiology and internal medicine practitioners cardiology fellows and medical residents rapid access to the latest ideas and techniques needed for today's gold standard diagnosis and management of cardiac patients

Chronic Care Nursing

Linda Deravin-Malone, Judith Anderson, 2016-07-01 Chronic Care Nursing A Framework for Practice provides a comprehensive and accessible overview of the role of the nurse in dealing with chronic conditions across a variety of healthcare settings in Australia and New Zealand The first part of the book provides a road map for the implementation of chronic care by outlining how two essential approaches to chronic care management the Chronic Care Model and the World Health Organization's Innovative Care for Chronic Conditions Framework can help to improve patient outcomes at both national and international levels The second part devotes separate chapters to key conditions including dementia disability palliative care and mental health and highlights the pressing contemporary considerations of each condition Written by an expert author team of clinicians and academics this book is full of helpful educational tools such as national competencies case studies and reflective questions and is an indispensable resource for students and registered nurses

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each problem is unique and need to be mapped into algorithmic framework before it can be solved in this section an example problem is mapped into gsa see more

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as mentioned in the previous section gsa is a population based stochastic algorithm and is inspired from the laws of gravitation it starts by assigning initial random positions to search agents each agent is characterized by its position and mass active gravitational mass passive gravitational mass or inertial see more

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to understand how the mapped problem is solved by gsa the results of various steps of the algorithm are given below for one iteration optimization problem see more

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